

REMARKS

Claims 1-16 and 23-28 remain in the application. No claim amendments are made in this paper. Claims 1 and 23 are the independent claims herein. Reconsideration and further examination are respectfully requested, in view of the following arguments.

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Applicants respectfully traverse the pending objection to the specification.

It is respectfully submitted that the relevant patent rules do not require that the specification include a “summary of the invention”. Indeed, it is the policy of some major patent holders, including the assignee of the present application, never to include a “summary of the invention” section in the patent specification.

To support their position, applicants will now quote pertinent parts from the relevant patent rules:

37 CFR § 1.73: “A brief summary of the invention indicating its nature and substance ... should precede the detailed description. Such summary should, when set forth, be commensurate with the invention as claimed” [Emphasis added]

37. CFR § 1.71: “(a) The specification must include a written description of the invention or discovery and of the manner and process of making and using the same, and is required to be in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which the invention or discovery appertains, or with which it is most nearly connected, to make and use the same.” [Emphasis added]

Applicants respectfully submit that the language of Rule 73 clearly indicates that the “summary of the invention” section is recommended but optional, and not mandatory. The Examiner’s attention is particularly directed to the phrase “when set forth” in Rule 73. Such language could not be included if the “summary of the invention” section were mandatory.

Moreover, the word “should” in Rule 73 has the meaning that the provision is a recommendation, not a requirement. By contrast, when an attribute of the application is required, the words “must” and/or “required” are used in the Rules, as in the case of the quoted section of Rule 71.

Applicant therefore is within his rights in respectfully declining to add a “summary of the invention” section to the specification of this application. It is requested that the objection to the specification be reconsidered and withdrawn.

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Claim Rejections – 35 USC § 103

Claims 1-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Messina (U.S. Patent No. 5,239,200) in view of Lewis et al. (U.S. Patent No. 5,569,950).

Claim 1 is directed to an “apparatus” which includes “an integrated circuit (IC) die having a front surface on which an integrated circuit is formed and a rear surface that is opposite to the front surface”. The apparatus of claim 1 further includes “a member to define at least one microchannel at the rear surface of the IC die, the microchannel to allow a coolant to flow therethrough”. In addition, the apparatus of claim 1 includes “at least one thin film thermoelectric cooling (TFTEC) device in the at least one microchannel”.

In formulating the rejection of claim 1, the Examiner relied on an asserted combination of the Messina and Lewis references. However, applicant respectfully traverses the rejection of claim 1 and will demonstrate in remarks to follow that the references relied upon by the Examiner, taken alone or in combination, fail to disclose the claimed feature of a thin film thermoelectric cooling device that is located in a microchannel defined at a rear surface of an IC die.

To provide an overview of the most relevant teachings of the two references, Messina discloses a cooling plate 20 which operates to conduct heat away from ICs 16. The cooling plate 20 has formed therein channels 22, which the Examiner considers to be microchannels. A coolant flows through the channels 22.

The Examiner cites Lewis as allegedly disclosing “a thin film TEC device”. The Examiner cites element 18 in Lewis as being such a device. In this respect, applicant respectfully urges that the Examiner is in error. The element 18 in Lewis is indeed a thermoelectric cooling (TEC) device, but it is not a thin film TEC device. The thin film device 22 shown in Lewis is a thermocouple (column 2, lines 42-43), not a TEC device. Thus it appears that the Examiner has misread the Lewis reference and has mistakenly concluded that the reference discloses a thin film TEC device, when in fact it does not.

It is believed that this error alone is sufficient reason for the pending rejection of claim 1 to be reconsidered and withdrawn. Nevertheless, there is at least one other significant flaw in the pending rejection of claim 1.

In explaining his rationale for the rejection, the Examiner noted that Messina fails to disclose at least one thin film thermoelectric cooling device in at least one microchannel. In this respect, applicant agrees with the Examiner.

Thereafter, the Examiner (erroneously) describes the disclosure of the Lewis reference and then goes on to state the following conclusion of obviousness:

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a TFTEC as taught by Lewis employed in the apparatus of Messina in order to provide active temperature control and reduce a leakage power consumption.

Aside from the error, noted above, in attributing disclosure of a thin film TEC device to Lewis, this conclusion of obviousness is further flawed in that it fails to state a prima facie case of obviousness. Applicant finds it particularly significant that the above-quoted conclusion of obviousness fails to take into consideration a key claim limitation, namely that the thermoelectric device of claim 1 is located in a microchannel. Applicant believes that if the Examiner had properly taken this claim limitation into consideration, it would not have been possible for the Examiner to conclude that the apparatus of claim 1 is rendered obvious by the combination of the Messina and Lewis references. Neither of the references, nor the combination thereof, teaches or

suggests placement of a thermoelectric cooling device in a microchannel in which a coolant flows for an IC die.

To summarize applicant's contentions with respect to claim 1, the Lewis reference does not disclose a thin film TEC device, and there is nothing in either reference, or elsewhere in the prior art, that would lead one of ordinary skill to dispose a thin film TEC in the coolant channels disclosed in the Messina reference. It is therefore respectfully requested that the rejection of claim 1 should be reconsidered and withdrawn.

Claims 15 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Messina in view of Lewis as applied to claims 1-9, 11 above, and further in view of Jaeck U.S. Patent No. 6,794,760.

The above remarks in regard to claim 1 are equally applicable to the only other independent claim, which is claim 23. Thus claim 23 is submitted as patentable on the same basis as claim 1. In addition, the other pending claims, all being dependent claims, are submitted as patentable on the same basis as the independent claims.¹

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STATEMENT OF COMMON OWNERSHIP

The Jaeck reference (U.S. Patent No. 6,794,760), which the Examiner included in a combination of references applied to reject claims 15, 23-25 and 26 under 35 U.S.C. 103(a), was at the time of the invention commonly owned with the subject matter of the present application by Intel Corporation, the assignee of this application. Since the Jaeck reference is available as prior art against this application, if at all, only pursuant to 35 U.S.C. 102(e), Section 103(c) disqualifies the Jaeck reference from use in an obviousness rejection under Section 103(a), in view of the above-noted common ownership.

The foregoing therefore provides another reason why the rejection of claim 23 (and other claims rejected based on Jaeck) should be withdrawn.

¹ Noting that the Examiner is new to this case, applicant is taking the liberty of appending the related PCT Written Opinion, which was also appended to the Response filed herein in December, 2006. Although the Examiner is of course under no obligation to do so, he is respectfully urged to take the PCT Written Opinion into consideration. It is noted that the Written Opinion finds the claimed subject matter to be both "new" and "inventive". To quote a key passage of the Written Opinion: "[T]here is no hint in the prior art to provide microchannels through which a fluid flows with thin film thermoelectric cooling (TFTEC) devices."

CONCLUSION

Accordingly, Applicant respectfully requests allowance of the pending claims. If any issues remain, or if the Examiner has any further suggestions for expediting allowance of the present application, the Examiner is kindly invited to contact the undersigned via telephone at (203) 972-3460.

Respectfully submitted,



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